

What is the true identity of the brown lacewings called *Hemerobius australis* (Neuroptera, Hemerobiidae)?

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Abstract. – Two brown lacewings have been previously described with the same binominal name *Hemerobius australis*, successively by Walker in 1853 and Leraut in 1992. The first one is a valid Australian species and the second, a European montane-dwelling one. The study of their external characters together with the male internal genital structure showed that they are undoubtedly different; the second must be considered as an invalid name because preoccupied. A new replacement name is proposed: *Hemerobius sucinus* nom. nov. for *H. australis* Leraut, 1992. Its place into an identification key to males of the *nitidulus* group is tentatively pointed out.

Résumé. – Quelle est la véritable identité des Hémérobos nommés *Hemerobius australis* (Neuroptera, Hemerobiidae) ? Deux Hémérobos ont été décrits sous le même nom d'*Hemerobius australis*, respectivement par Walker en 1853 et Leraut en 1992. Le premier est une espèce australienne valide tandis que le second est européen et se rapporte à une espèce de montagne. L'étude de leurs caractères externes et de la structure génitale des mâles montre que les deux espèces sont à l'évidence différentes ; le nom de la seconde doit donc être considéré comme non valide car préoccupé et un nom de remplacement est proposé : *Hemerobius sucinus* nom. nov. pour *H. australis* Leraut, 1992. Il est positionné dans une clé de détermination des mâles du groupe *nitidulus*.

Keywords. – Taxonomy, *nitidulus* group, morphology.

Amongst the brown lacewings of the Palaearctic region, there are some species we regroup under the name “*nitidulus* group”: the membrane of their wings is spotless, the longitudinal veins and the costal veinlets in the forewings are pale brown and hardly dotted with closely placed small dark dashes. They are in chronological order: *Hemerobius nitidulus* Fabricius, 1777, *H. handschini* Tjeder, 1957, *H. schedli* Hölzel, 1970, and *H. australis* Leraut, 1992. *H. australis* Leraut is currently considered as a synonym of *H. nitidulus*.

Hemerobius schedli is easily separable from *H. nitidulus* and *H. handschini* by the outline of the male genital apparatus, the lateral arms of the gonarcus of *H. schedli* being strait, acute and laterally reflexed (fig. 1) vs rounded and large in the two commonly recorded *H. nitidulus* (fig. 2) and *H. handschini* (fig. 3).

Separating these species is more difficult because the criterion usually given in identification keys is of the kind “more-or-less” with respect to the lengths of the ectoproct distal lobes, katoprocessus and anoprocessus. That may induce a measure of uncertainty as a consequence of overlapping already noted by ASPÖCK *et al.* (2001). This is why LERAUT (1992) tried to solve this ambiguity in recognizing a form he judged new to science, with katoprocessus of a length intermediate between the two previous species. He gave this new form the status of species and called it *Hemerobius australis* Leraut, 1992. Unfortunately, this name was already preoccupied, long ago assigned by WALKER (1853) to another brown lacewing from eastern Australia (New South-Wales and Queensland). Walker's taxon has been first contested because the genus *Hemerobius* Linnaeus, 1758, was not recorded on this continent; it is now admitted by the neuropterists' community and has been carefully re-described by NEW (1981) who confirmed

its presence in Australia. It is important now, therefore, to examine the relevance of the second designation and consequently to look for synonymy or invalidity.

MATERIAL AND METHODS

The present study is mainly based on previous studies, mainly KILLINGTON (1937), KIS *et al.* (1970) and ASPÖCK *et al.* (1980) for *Hemerobius nitidulus* and *H. handschini*, HÖLZEL (1970) and ASPÖCK *et al.* (1980) for *H. schedli*, WALKER (1853) and NEW (1981) for *H. australis* Walker and LERAUT (1992) for *H. australis* Leraut.

The illustrations either are partly from already published figures or issued from photographs pictured by D. Thierry.

Material examined. – Some specimens (preserved in D. Thierry's collection) directly used for observation, photograph and drawing, are:

Hemerobius nitidulus. **France:** 1 ♀, Prunet, pass of Croix Millet, 770 m, 44°36'24"N - 4°14'33"E, 4.VII.2017, border coniferous forest; 3 ♀, Dieulefit, 44°32'N - 5°04'E, 550 m, VII.2000, dry scrub, oaks and pines; 1 ♂, Reugny, 47°29'N - 0°53'E, 110 m, 1.V.2003, fallow land; 6 ♂, 6 ♀, Saint-Pierre-Bois, 48°20'N - 7°22'E, 400 m, VII.2014, on isolated pines; 2 ♀, Beaumont-du-Ventoux, 44°10'N - 5°13'E, 1200 m, VII.2003, border of a coniferous forest. **Croatia:** 1 ♀, Rijeka, 45°20'N - 14°27'E, 180 m, VIII.1989, dry landscape, on an isolated tree. **Poland:** 1 ♀, Zwerzyńiec, 50°37'N - 22°58'E, 230 m, VII.2013, on an isolated pine-tree.

H. handschini. **France:** 1 ♂, Valgorge, 44°36'26"N - 4°04'27"E, pass of Meyrand, 1370 m, 13.VII.2017, border of a pine forest; 2 ♂, 3 ♀, Lançon, 42°53'N - 0°22'E, 1000 m, V.1998, on juniper trees in border of a pine forest; 1 ♂, 3 ♀, Beaumont-du-Ventoux, 44°10'N - 5°13'E, 1200 m, VII.2003, border of a pine forest. **Bulgaria:** 1 ♂, Pirin, National Park, 41°44'N - 23°26'E, VII.2001, wooded landscape. **Czech Republic:** 1 ♂, Loděnice, 50°00'N - 14°09'E, 270 m, VII.2013, hedge near deciduous and coniferous landscape.

H. australis Leraut (syn. of *H. sucinus* nom. nov., see below). **France:** 1 ♂, Dieulefit, 44°32'N - 5°04'E, 550 m, VII.2000, on an isolated pine; 1 ♂, Lançon, 42°53'N - 0°22'E, 1000 m, V.1998, on juniper bush in border of a pine forest.

H. schedli. No direct observation.

RESULTS

Hemerobius sucinus nom. nov.

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Hemerobius australis Leraut, 1992: 9 (*nec H. australis* Walker, 1853)

Main distinguishing characters of the two so-called *Hemerobius australis* species. – In addition to the previous original published descriptions, one may note some traits.

In the genital apparatus of *Hemerobius australis* Walker, the anoprocesses of the male ectoprocts are elongated, bearing ventrally a cluster of setae inclined forwards (fig. 5) *vs* naked in *H. australis* Leraut (fig. 11), the katoprocesses are missing (fig. 5) *vs* present in *H. australis* Leraut (fig. 11), the gonarcus complex shows two straight lateral arms elongated and down turned (fig. 6) *vs* rounded in *H. australis* Leraut (fig. 4), the twin arcessus pieces are crossed (fig. 6) *vs* straight and sub-parallel in *H. australis* Leraut (fig. 4), the hypandrium is sub-rectangular without any posterior axial prolongation.

In the female of *Hemerobius australis* Walker, the lateral gonapophyses are large and broadly rounded (fig. 7), the sub-genital plate is well-developed, arcuate, transverse.

Taxonomical comment. – Taking in account the clear differences of morphological characters of the above-mentioned *Hemerobius* both called *H. australis*, there is no similarity and the two species are not synonymous. Consequently, the taxon *H. australis* Leraut, 1992, is not valid because preoccupied. Due to the particular morphological characteristics of the males of

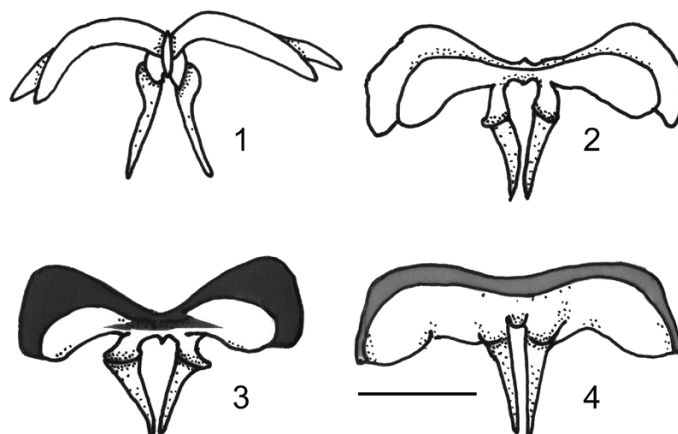


Fig. 1-4. – *Hemerobius* spp., internal male genital structures. – 1, *H. schedli* Hölzel, after HÖLZEL (1970), scale not appointed. – 2, *H. nitidulus* Fabricius. – 3, *H. handschini* Tjeder. – 4, *H. sucinus* nom. nov. (after the Pyrenean specimen). All pictured by D. Thierry. Scale bar: 0.1 mm.

H. australis Leraut, allowing to unambiguously distinguishing them from males of *H. nitidulus* (see the identification key below), we propose firstly to remove *H. australis* Leraut from synonymy, secondly to give this taxon the status of valid species with the following replacement name: *Hemerobius sucinus* **nom. nov.** for *H. australis* Leraut, 1992, derived from the Latin *sucinum* (yellow-colored amber gum), due to the pale color of the living specimens.

Hemerobius sucinus is yet little known due to the uncertainty currently encountered until now for identification.

IDENTIFICATION KEY TO MALES OF THE EUROPEAN SPECIES OF THE *NITIDULUS* GROUP

Separating the species is easy for the males, but much more blurred if not impossible for females.

1. Gonarcus with long, straight, slightly down-turned arms, arcessus diverging backwards (fig. 1) *Hemerobius schedli* Hölzel
- Gonarcus with large rounded lobes, arcessus different 2
2. Arcessus converging backwards (fig. 3), katoprocessus index finger-shaped, two times as long as the anoprocessus (fig. 10) *H. handschini* Tjeder
- Arcessus sub-parallel, katoprocessus blunt of medium size, thumb-like (fig. 9, 11) 3
3. Gonarcus like open wings of a bird of prey (fig. 4) *H. sucinus* nom. nov.
- Gonarcus like a pair of large spatulas (fig. 2) *H. nitidulus* Fabricius

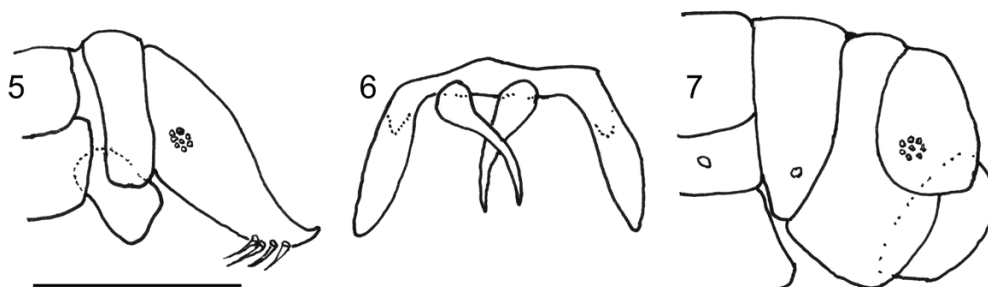


Fig. 5-7. – Genital structure of *Hemerobius australis* Walker, after New (1981). – 5, Apex of male abdomen, lateral view (scale bar: 0.5 mm). – 6, male internal apparatus, gonarcus and arcessus (scale not appointed). – 7, Apex of female abdomen lateral view (scale bar: 0.5 mm).

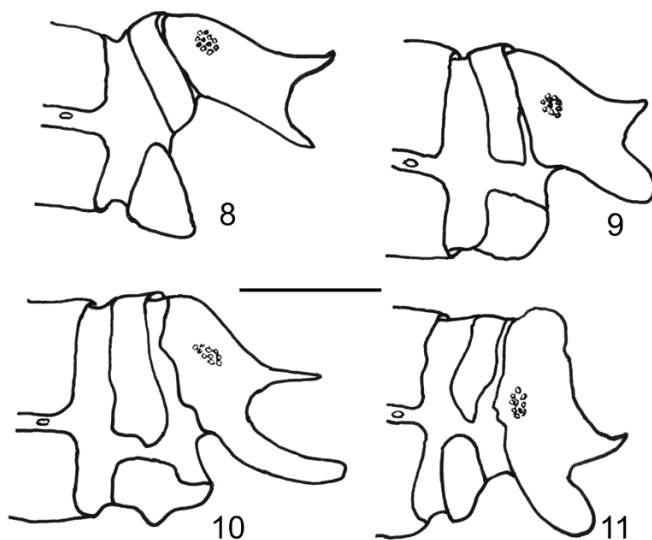


Fig. 8-11. – *Hemerobius* spp., outlines of the male terminalia. – 8, *H. schedli* Hölzel. – 9, *H. nitidulus* Fabricius. – 10, *H. handschini* Tjeder. – 11, *H. sucinus* nom. nov. Scale bar: ca 0.5 mm.

DISTRIBUTION

The distribution of the species of the *Hemerobius nitidulus* group in the Palearctic region as given by ASPÖCK *et al.* (1980, 2001) is the following:

– *H. nitidulus* is the most widely and commonly recorded, from south in Greece (Peloponnesus) to north, Lapponia and the polar circle (MEINANDER, 1962), longitudinally from Kamchatka to north-western Spain. It is more abundant north of 45°N;

– *H. handschini* is a Mediterranean species occurring eastwards to Anatolia and is latitudinally localized southwards to 50 °N;

– *H. schedli* has a peculiar distribution, known from only a few European mountains (Pyrenees, Alps, Tatra and Rila mountains) on pine trees above 1900 m of altitude (POPOV *et al.*, 2018).

The data related to *Hemerobius sucinus* were confused due to the difficulty to clearly separate it from close species. It was only recorded with certainty in French mountains of the Alps (departments of Alpes-de-Haute-Provence, Hautes-Alpes), the Pyrenees (Pyrénées-Orientales, Hautes-Pyrénées) and pre-alpine massifs like the Mount Ventoux (Vaucluse) (LERAUT, 1992). Nevertheless, this taxon is probably more common in Europe: according to ASPÖCK *et al.* (1980), some specimens belonging to the *nitidulus* group were meanwhile judged dubious with respect to the classical forms known in this time; they were then reported from northern Anatolia, Greece, Bulgaria, Central Europe, south of France and west of the Iberian Peninsula.

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